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UV curabl scratch resistant coatings for thermoplastics - contg. polyunsaturat d monomer and a photoinitiator, with heating during irradiati n to improve adhesion

Scratch-resistant coatings are applied to the rmoplastic and thermoelastic substrates by applying a UV-curable compsn. comprising a radical polymerisable monomer with at least two polymerisable C-C double bonds (alone or mixed with other monomers contg. polymerisable double bonds with a b.pt. above the curing temp.) and a photoinitiator, and curing the coating by means of UV radiation at a temp. between 70 deg.C and the Tg of the plastic.

USE/ADVANTAGES

The process is esp. useful for applying scratch-resistant coatings to polystyrene, rigid PVC, HIPS, polycarbonates, acrylic resins, etc., and esp. to PMMA and polycarbonate glass. Curing the coating at elevated temp. gives coating films with improved adhesion to the substrate.

DETAIL

The coatings are e.g. 2-30 micrometres thick and are cured by UV radiation at 70-150, esp. 80-130 deg.C. Curing

is carried out e.g. with UV radiation at 250-400 nm wavelength for at most 20 sec. The coating may be applied e.g. to extruded sheet or film 20 micrometres to 8 mm thick e.g. of polycarbonate or acrylic polymers contg. at least 60% Me methacrylate. Coating is carried out e.g. immediately after extrusion, pref. under a low-oxygen or oxyg n-free atmos.

Typical monomers are acrylic esters of two- or more hydric alcohols such as glycerin, trimethylolpropane, pentaerythritol, 1,2,4-butanetriol, etc., opt. mixed with other monomers contg. 1 or 2 double bonds such as (di)ethyleneglycol di(meth)acrylate, propyleneglycol di(meth)acrylate, (meth)acrylonitrile, styrene, etc.

Typical photoinitiators are benzoin, 2-methylbenzoin, benzil, benzophenone, etc.

EXAMPLE

A polymethylmethacrylate sheet at 90 deg.C was coated with a compsn. comprising (by wt.) 75 pts. trimethylolpropanetriacrylate, 20 pts. pentaerythritol tetraacrylate and 5 pts. wt. benzoin isobutylether, and cured with a Hg lamp for 30 sec. The coating had excellent adhesion and scratch resistance.(13pp513)

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